



Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

PRESCRIBED BURNING

CODE 338

(ac)

DEFINITION

Controlled fire applied to a predetermined area.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Control undesirable vegetation
- Prepare sites for harvesting, planting or seeding
- Control plant disease
- Reduce wildfire hazards
- Improve wildlife habitat
- Improve plant production quantity and/or quality
- Remove slash and debris
- Enhance seed and seedling production
- Facilitate distribution of grazing and browsing animals
- Restore and maintain ecological sites

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands as appropriate.

CRITERIA

GENERAL CRITERIA APPLICABLE TO ALL PURPOSES

All prescribed burns shall address the following items:

- Location and description of the burn area.
- Pre-burn vegetation cover.
- Resource management objectives.
- Required weather conditions for prescribed burn.
- Notification check list.
- Pre-burn preparation.
- Equipment checklist/personnel assignments and needs/safety requirements.
- Post burn evaluation criteria.
- Firing sequence.
- Ignition method.

- Approval signatures

The procedure, equipment, and the number of trained personnel shall be adequate to accomplish the intended purposes. **Only NRCS staff with proper job approval authority may assist in developing or reviewing a burn plan. NRCS staff will not under any circumstances assist in conducting the burn.** See Appendix. A of the NRCS-National Range and Pasture Handbook for national and state prescribed burning policy.

Landowner cooperators will be cautioned to burn in accordance with applicable federal, state, and local laws and regulations. They must understand that they may be liable for damages caused by fire escaping from their land or for damage caused to others from inadequate smoke management. They may also be responsible for fire suppression cost, should the fire escape the designated area.

The expected weather conditions, human and vehicular traffic that may be impeded by heat or smoke, liability (e.g., utility lines) and safety and health precautions shall be integrated into the timing, location and expected intensity of the burn.

Timing of burning will be commensurate with soil and site conditions to maintain site productivity and minimize effects on soil erosion and soil properties (structure, soil moisture).

Weather parameters and other data that affect fire behavior should be monitored during the burn. Carbon release should be minimized by the timing and burn intensity.

Consider the location of utilities such as electric power lines and natural gas pipelines to prevent damage to the utility and avoid personal injury.

Smoke impacts must be considered before the burn and should be monitored during the burn.

Kind of Fires

There are three basic kinds of prescribed fires. The selection of a burning pattern will be done by individuals properly trained and experienced in prescribed burning. The specific burn pattern will be based on the burn objective and site specific conditions.

1. Backing Fires. Back fires are the hottest type of burn, and burn into the wind. Fire is started along a prepared firebreak, and allowed to burn into the wind. Back fires work best with wind velocities of 4-12 MPH from a constant direction. Burning downward on slopes has an effect similar to backfires.
2. Head Fires. Head fires burn with the wind. They have greater flame lengths, faster rates of spread, greater smoke volumes and burn cooler than backing or flank fires.
Always burn a strip downwind with a backfire wide enough to control the head fire.
3. Flank Fire. Flank fires burn at oblique angles to the wind direction. Flank fires are often used to secure the flanks of a head fire as the head fire progresses. This method requires expert crew coordination and timing.

Containing Fire

Refer to practice standard Firebreak (394).

General Burning Prescriptions

Conduct a test burn on the down wind side of the planned burn area and within the protection of an established firebreak. Use the test burn to confirm that the fire will burn as predicted, the burn will achieve the planned objective, and the smoke can be managed as planned. Defer the burn if the test burn is not satisfactory or if prolonged drought has caused high fire danger levels. Burn only within the prescription set forth in the prescribed burn plan.

For additional specific criteria to improve wildlife habitat and restore and manage oak savanna communities refer to practice standards Early Successional Habitat Development/Management (647) and Restoration and Management of Declining Habitats (643).

Timing to Enhance or Control

1. Native warm season species:
Burn in late spring, about May 1 in southern Minnesota and May 15 in the northern part of the state.

2. Native cool season species:
Best responses are obtained with very early spring (March - April) or late summer (August-September) burns.

Mixture of exotic cool-season grasses and legumes:

3. Best response with burns during March to June; least response by legumes in late summer-early fall burns.
4. Woody Vegetation (brush and small trees):

Late summer or early fall (August-September) burns are most effective in controlling woody vegetation. Spring burns (May-June) generally induce shrubs and brush to sprout, but frequent fires may reduce frequency of woody plant cover. Usually, conditions will not be dry enough to burn until after a frost in late September or early October. Additional chemical treatment may be necessary for complete control.

Frequency of burning should be based on regrowth of targeted species and weighed against forage and/or wildlife habitat considerations.

Weather Conditions

Weather Conditions

Ideal burning conditions:	
1. Temperature:	70-90 degrees F
2. Relative Humidity:	25 to 50 percent
3. Wind:	Steady winds between 5-18 MPH
4. Moisture:	5-11 percent
5. Time:	10 a.m. to 4 p.m.

Smoke Management

Smoke impacts should be considered before the burn and monitored during the burn.

Critical considerations for smoke management include:

1. A 360 degree check for possible restrictive air space.
2. A 360 degree check for sensitive areas such as residences, roads, airports.
3. A check of sensitive areas downwind and 45 degrees either side of initial wind direction.
4. An estimate of the length of time necessary to conduct the burn, plus a margin of error for wind shift or loss of speed, to predict smoke duration.
5. Electrical or high power transmission lines will be documented and the burn plan designed and applied so that high dense smoke columns will not cross under or contact these lines. Electrical discharge can occur due to high concentrations of carbon in smoke columns.

General considerations for smoke management:

1. Moist fuels produce more smoke than dry fuels.
2. Head fires produce more smoke than slower burning backing fires.
3. Smoke problems at night are more hazardous than during daylight.
4. Stable air mass conditions can cause air inversions, which restrict smoke convection. Unstable atmospheric conditions are usually better for smoke management.

Grazing Procedure

1. Frequency of burning will be based on extent and duration of grazing responses, but should generally not be more than once every three years.
2. Prior to burning, defer grazing in area to be burned for one full grazing season so that sufficient residue is present to carry a fire.
3. After burning, defer grazing until managed grasses have 6-8 inches of new growth.

CONSIDERATIONS

General Considerations

Burning should be managed with consideration for wildlife and pollinator needs such as nesting, feeding and cover.

Existing barriers such as lakes, streams, wetlands, roads and constructed firebreaks are important to the design and layout of this practice.

Notify adjoining landowners, local fire departments and public safety officials as appropriate within the airshed prior to burning.

Prescribed burning **is generally not** meant to be an annual management practice. Burn **only** to meet a specific management objective. (See Purposes).

Clients without experience in burning should be advised to seek assistance from persons who have adequate training or experience in applying this practice, such as the Department of Natural Resources, US Fish and Wildlife Service, The Nature Conservancy, rural fire departments and private consultants. NRCS staff will not assist in burn application.

Consider cultural resources when planning this practice. This practice may adversely affect cultural resources and should comply with GM 420, Part 401 during planning, prior to installation and during maintenance

PLANS AND SPECIFICATIONS

Specifications will be prepared by certified individuals and prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation. All necessary permits must be obtained and a burning plan developed before implementation of the practice.

A written burn plan will be prepared by properly trained individuals. Specifications must adhere to all applicable NRCS policies in the General Manual and the National Range and Pasture Handbook, as well as all applicable state and local laws, ordinances, and regulations. The landowner or land operator will obtain necessary approval, permits and variances prior to conducting the prescribed burn.

Refer to the NRCS-National Range and Pasture Handbook for sample burn plans. Required items of a burn plan shall include, but are not limited to:

- Location of the burn.
- Resource management objectives of the burn.
- Necessary approvals, permits and variances.

- Pre-burn vegetative description of the area.
- Prescription for weather conditions required and observed conditions.
- Description of the burning method to be used.
- Description of pre-burn preparation.
- Firing sequence of area to be burned.
- Smoke management considerations.
- Contingency plan for fire escapes.
- Communication plan.
- Job assignments and descriptions of responsibilities for all persons assisting with the burn.
- Equipment and materials checklist (ex. drip torches, tractors, discs, pump trailers etc.).
- Job assignments and descriptions of responsibilities for all persons assisting with fire patrol, containment, mop-up, and suppression of the burn.
- Post-burn evaluation and management.
- Burn boss or landowner signature acknowledging acceptance of full liability resulting from implementation of the burn plan.

OPERATION AND MAINTENANCE

The kinds and expected variability of site factors (e.g., fuel condition and moisture content, weather conditions, human and vehicular traffic that may be impeded by heat or smoke, liability, and safety and health precautions) shall be monitored during the operation of this practice. Sufficient fire suppression equipment and personnel shall be available commensurate with the expected behavior of these factors during the time of burning to prevent a wildfire or other safety, health or liability incident.

Maintenance shall include monitoring of the burned site and adjacent areas until ash, debris and other consumed material is at pre-burn temperatures.

REFERENCES

Davis, G. 1987. Sharp-Tailed Grouse Habitat Management For Private Landowners. Minnesota Sharp-tailed Grouse Society. Duluth, MN. 6pp.

Higgins, K.F., Kruse, A.D., Piehl, J.L. 1989. Prescribed Burning Guidelines in the Northern Great Plains. U.S. Fish and Wildlife Service. Cooperative Extension Service-SDSU. USDA EC 760.

Higgins, K.F., Kruse, A.D., Piehl, J.L. Effects of Fire in the Northern Great Plains. U.S. Fish and Wildlife Service. Cooperative Extension Service-SDSU. USDA EC 761.

MDNR. 2003. Prescribed Burning in Grassland. Video.

MDNR. 1994. The Benefits of Prescribed Burning on Private Land. Section of Wildlife. St. Paul, MN.

USDA-NRCS. 1997. National Range and Pasture Handbook.

USDA-NRCS. 2007. Planning and Conducting Prescribed Burns in Minnesota. Biology Technical Note #13.